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Survey of Reader Preferences Concerning the Format of NASA Langley-Authored Technical Reports – Results of the Phase 1 Mail Survey

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SURVEY OF READER PREFERENCES CONCERNING THE FORMAT OF NASA LANGLEY-AUTHORED TECHNICAL REPORTS-- RESULTS OF THE PHASE 1 MAIL SURVEY

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ABSTRACT

The U.S. government technical report is a primary means by which the results of federally funded research and development (R&D) are transferred to the U.S. aerospace industry. However, little is known about this information product in terms of its actual use, importance, and value in the transfer of federally funded R&D. Little is also known about the intermediary-based system that is used to transfer the results of federally funded R&D to the U.S. aerospace industry. To help establish a body of knowledge, the U.S. government technical report is being investigated as part of the *NASA/DoD Aerospace Knowledge Diffusion Research Project*. In this report, we summarize the literature on technical reports, present a model that depicts the transfer of federally funded aerospace R&D via the U.S. government technical report, and present the results of research that investigated aerospace knowledge diffusion vis-à-vis the technical report. To learn more about the preferences of U.S. aerospace engineers and scientists concerning the format of NASA Langley Research Center-authored technical reports, we surveyed 133 report producers (i.e., authors) and 137 report users. Questions covered such topics as (a) the order in which report components are read, (b) components used to determine if a report would be read, (c) those components that could be deleted, (d) the placement of such components as the symbols list, (e) the desirability of a table of contents, (f) the format of reference citations, (g) column layout and right margin treatment, and (h) and person and voice. Mail (self-reported) surveys were used to collect the data. The response rates for report producers (i.e., authors) was 68% and for users was 62%.

INTRODUCTION

NASA and the DoD maintain scientific and technical information (STI) systems for acquiring, processing, announcing, publishing, and transferring the results of government-performed and government-sponsored research. Within both the NASA and DoD STI systems, the U.S. government technical report is considered a primary mechanism for transferring the results of this research to the U.S. aerospace community. However, McClure (1988) concludes that we actually know little about the role, importance, and impact of the technical report in the transfer of federally funded R&D because little empirical information about this product is available.

We are examining the system(s) used to diffuse the results of federally funded aerospace R&D as part of the *NASA/DoD Aerospace Knowledge Diffusion Research Project*. This project investigates, among other things, the information-seeking behavior of U.S. aerospace engineers and scientists, the factors that influence the use of STI, and the role played by U.S. government

technical reports in the diffusion of federally funded aerospace STI (Pinelli, Kennedy, and Barclay, 1991; Pinelli, Kennedy, Barclay, and White, 1991). The results of this investigation could (a) advance the development of practical theory, (b) contribute to the design and development of aerospace information systems, and (c) have practical implications for transferring the results of federally funded aerospace R&D to the U.S. aerospace community. The project fact sheet is Appendix A.

In this report, we summarize the literature on technical reports, provide a model that depicts the transfer of federally funded aerospace R&D through the U.S. government technical report, and present the results of a survey of U.S. aerospace engineers and scientists that solicited their opinions concerning the format of NASA Langley Research Center-authored technical reports, we surveyed 133 report producers (i.e., authors) and 137 report users. Mail (self-reported) surveys were used to collect the data. The response rates for report producers (i.e., authors) was 68% and for users was 62%. Questions covered such topics as (a) the order in which report components are read, (b) components used to determine if a report would be read, (c) those components that could be deleted, (d) the placement of such components as the symbols list, (e) the desirability of a table of contents, (f) the format of reference citations, (g) column layout and right margin treatment, and (h) and person and voice.

THE U.S. GOVERNMENT TECHNICAL REPORT

Although they have the potential for increasing technological innovation, productivity, and economic competitiveness, U.S. government technical reports may not be utilized because of limitations in the existing transfer mechanism. According to Ballard, et al., (1986), the current system "virtually guarantees that much of the Federal investment in creating STI will not be paid back in terms of tangible products and innovations." They further state that "a more active and coordinated role in STI transfer is needed at the Federal level if technical reports are to be better utilized."

Characteristics of Technical Reports

The definition of the technical report varies because the report serves different roles in communication within and between organizations. The technical report has been defined etymologically, according to report content and method (U.S. Department of Defense, 1964); behaviorally, according to the influence on the reader (Ronco, et al., 1964); and rhetorically, according to the function of the report within a system for communicating STI (Mathes and Stevenson, 1976). The boundaries of technical report literature are difficult to establish because of wide variations in the content, purpose, and audience being addressed. The nature of the report--whether it is informative, analytical, or assertive -- contributes to the difficulty.

Fry (1953) points out that technical reports are heterogenous, appearing in many shapes, sizes, layouts, and bindings. According to Smith (1981), "Their formats vary; they might be brief (two pages) or lengthy (500 pages). They appear as microfiche, computer printouts or

vugraphs, and often they are loose leaf (with periodic changes that need to be inserted) or have a paper cover, and often contain foldouts. They slump on the shelf, their staples or prong fasteners snag other documents on the shelf, and they are not neat."

Technical reports may exhibit some or all of the following characteristics (Gibb and Phillips, 1979; Subramanyam, 1981):

- Publication is not through the publishing trade.

- Readership/audience is usually limited.

- Distribution may be limited or restricted.

- Content may include statistical data, catalogs, directions, design criteria, conference papers and proceedings, literature reviews, or bibliographies.

- Publication may involve a variety of printing and binding methods.

The SATCOM report (National Academy of Sciences - National Academy of Engineering, 1969) lists the following characteristics of the technical report:

- It is written for an individual or organization that has the right to require such reports.

- It is basically a stewardship report to some agency that has funded the research being reported.

- It permits prompt dissemination of data results on a typically flexible distribution basis.

- It can convey the total research story, including exhaustive exposition, detailed tables, ample illustrations, and full discussion of unsuccessful approaches.

History and Growth of the U.S. Government Technical Report

The development of the [U.S. government] technical report as a major means of communicating the results of R&D, according to Godfrey and Redman (1973), dates back to 1941 and the establishment of the U.S. Office of Scientific Research and Development (OSRD). Further, the growth of the U.S. government technical report coincides with the expanding role of the Federal government in science and technology during the post World War II era. However, U.S. government technical reports have existed for several decades. The Bureau of Mines *Reports of Investigation* (Redman, 1965/66), the *Professional Papers of the United States Geological Survey*, and the *Technological Papers of the National Bureau of Standards* (Auger, 1975) are early examples of U.S. government technical reports. Perhaps the first U.S. government publications officially created to document the results of federally funded (U.S.)

R&D were the technical reports first published by the National Advisory Committee for Aeronautics (NACA) in 1917.

Auger (1975) states that "the history of technical report literature in the U.S. coincides almost entirely with the development of aeronautics, the aviation industry, and the creation of the NACA, which issued its first report in 1917." In her study, *Information Transfer in Engineering*, Shuchman (1981) reports that 75% of the engineers she surveyed used technical reports; that technical reports were important to engineers doing applied work; and that aerospace engineers, more than any other group of engineers, referred to technical reports. However, in many of these studies, including Shuchman's, it is often unclear whether U.S. government technical reports, non-U.S. government technical reports, or both are included (Pinelli, 1991a).

The U.S. government technical report is a primary means by which the results of federally funded R&D are made available to the scientific community and are added to the literature of science and technology (President's Special Assistant for Science and Technology, 1962). McClure (1988) points out that "although the [U.S.] government technical report has been variously reviewed, compared, and contrasted, there is no real knowledge base regarding the role, production, use, and importance [of this information product] in terms of accomplishing this task." Our analysis of the literature supports the following conclusions reached by McClure:

- The body of available knowledge is simply inadequate and noncomparable to determine the role that the U.S. government technical report plays in transferring the results of federally funded R&D.

- Further, most of the available knowledge is largely anecdotal, limited in scope and dated, and unfocused in the sense that it lacks a conceptual framework.

- The available knowledge does not lend itself to developing "normalized" answers to questions regarding U.S. government technical reports.

THE TRANSFER OF FEDERALLY FUNDED AEROSPACE R&D AND THE U.S. GOVERNMENT TECHNICAL REPORT

Three paradigms -- appropriability, dissemination, and diffusion -- have dominated the transfer of federally funded (U.S.) R&D (Ballard, et al., 1989; Williams and Gibson, 1990). Whereas variations of them have been tried within different agencies, overall Federal (U.S.) STI transfer activities continue to be driven by a "supply-side," dissemination model.

The Appropriability Model

The **appropriability model** emphasizes the production of knowledge by the Federal government that would not otherwise be produced by the private sector and competitive market pressures to promote the use of that knowledge. This model emphasizes the production of basic research as the driving force behind technological development and economic growth and assumes that the Federal provision of R&D will be rapidly assimilated by the private sector. Deliberate transfer mechanisms and intervention by information intermediaries are viewed as unnecessary. Appropriability stresses the supply (production) of knowledge in sufficient quantity to attract potential users. Good technologies, according to this model, sell themselves and offer clear policy recommendations regarding Federal priorities for improving technological development and economic growth. This model incorrectly assumes that the results of federally funded R&D will be acquired and used by the private sector, ignores the fact that most basic research is irrelevant to technological innovation, and dismisses the process of technological innovation within the firm.

The Dissemination Model

The **dissemination model** emphasizes the need to transfer information to potential users and embraces the belief that the production of quality knowledge is not sufficient to ensure its fullest use. Linkage mechanisms, such as information intermediaries, are needed to identify useful knowledge and to transfer it to potential users. This model assumes that if these mechanisms are available to link potential users with knowledge producers, then better opportunities exist for users to determine what knowledge is available, acquire it, and apply it to their needs. The strength of this model rests on the recognition that STI transfer and use are critical elements of the process of technological innovation. Its weakness lies in the fact that it is passive, for it does not take users into consideration except when they enter the system and request assistance. The **dissemination model** employs one-way, source-to-user transfer procedures that are seldom responsive in the user context. User requirements are seldom known or considered in the design of information products and services.

The Knowledge Diffusion Model

The **knowledge diffusion model** is grounded in theory and practice associated with the diffusion of innovation and planned change research and the clinical models of social research and mental health. Knowledge diffusion emphasizes "active" intervention as opposed to dissemination and access; stresses intervention and reliance on interpersonal communications as a means of identifying and removing interpersonal barriers between users and producers; and assumes that knowledge production, transfer, and use are equally important components of the R&D process. This approach also emphasizes the link between producers, transfer agents, and users and seeks to develop user-oriented mechanisms (e.g., products and services) specifically tailored to the needs and circumstances of the user. It makes the assumption that the results of federally funded R&D will be under utilized unless they are relevant to users and ongoing relationships are developed among users and producers. The problem with the knowledge diffu-

sion model is that (a) it requires a large Federal role and presence and (b) it runs contrary to the dominant assumptions of established Federal R&D policy. Although U.S. technology policy relies on a "dissemination-oriented" approach to STI transfer, other industrialized nations, such as Germany and Japan, are adopting "diffusion-oriented" policies which increase the power to absorb and employ new technologies productively (Branscomb, 1992; Branscomb, 1991).

The Transfer of (U.S.) Federally-Funded Aerospace R&D

A model depicting the transfer of federally funded aerospace R&D through the U.S. government technical report appears in figure 1. The model is composed of two parts -- the **informal** that relies on collegial contacts and the **formal** that relies on surrogates, information producers, and information intermediaries to complete the "producer to user" transfer process.

When U.S. government (i.e., NASA) technical reports are published, the initial or primary distribution is made to libraries and technical information centers. Copies are sent to surrogates for secondary and subsequent distribution. A limited number of copies are set aside to be used by the author for the "scientist-to-scientist" exchange of information at the collegial level.

Surrogates serve as technical report repositories or clearinghouses for the producers and include the Defense Technical Information Center (DTIC), the NASA Center for Aero Space Information (CASI), and the National Technical Information Service (NTIS). These surrogates have created a variety of technical report announcement journals such as *CAB* (Current Aware-

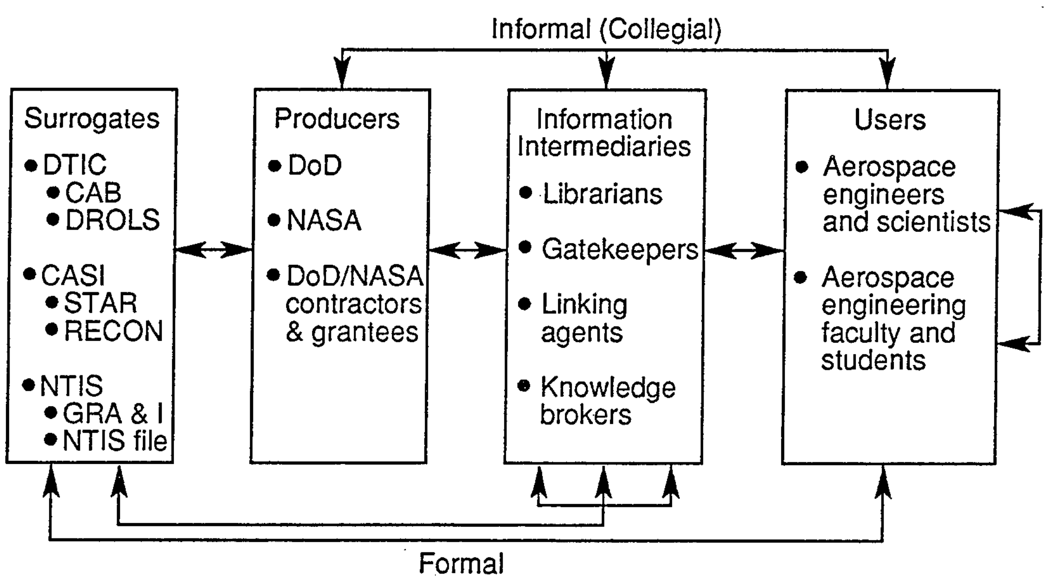

Figure 1. The U.S. Government Technical Report in a Model Depicting the Dissemination of Federally Funded Aerospace R&D.

ness Bibliographies), *STAR* (Scientific and Technical Aerospace Reports), and *GRA&I* (Government Reports Announcement and Index) and computerized retrieval systems such as *DROLS* (Defense RDT&E Online System), *RECON* (REsearch CONnection), and NTIS *On-line* that permit online access to technical report data bases. Information intermediaries are, in large part, librarians and technical information specialists in academia, government, and industry. Those representing the producers serve as what McGowan and Loveless (1981) describe as "knowledge brokers" or "linking agents." Information intermediaries connected with users act, according to Allen (1977), as "technological entrepreneurs" or "gatekeepers." The more "active" the intermediary, the more effective the transfer process becomes (Goldhor and Lund, 1983). Active intermediaries move information from the producer to the user, often utilizing interpersonal (i.e., face-to-face) communication in the process. Passive information intermediaries, on the other hand, "simply array information for the taking, relying on the initiative of the user to request or search out the information that may be needed" (Eveland, 1987).

The overall problem with the total Federal STI system is that "the present system for transferring the results of federally funded STI is passive, fragmented, and unfocused;" effective knowledge transfer is hindered by the fact that the Federal government "has no coherent or systematically designed approach to transferring the results of federally funded R&D to the user" (Ballard, et al., 1986). In their study of issues and options in Federal STI, Bikson and her colleagues (1984) found that many of the interviewees believed "dissemination activities were afterthoughts, undertaken without serious commitment by Federal agencies whose primary concerns were with [knowledge] production and not with knowledge transfer;" therefore, "much of what has been learned about [STI] and knowledge transfer has not been incorporated into federally supported information transfer activities."

Problematic to the **informal** part of the system is that knowledge users can learn from collegial contacts only what those contacts happen to know. Ample evidence supports the claim that no one researcher can know about or keep up with all the research in his/her area(s) of interest. Like other members of the scientific community, aerospace engineers and scientists are faced with the problem of too much information to know about, to keep up with, and to screen. Further, information is becoming more interdisciplinary in nature and more international in scope.

Two problems exist with the **formal** part of the system. First, the **formal** part of the system employs one-way, source-to-user transmission. The problem with this kind of transmission is that such formal one-way, "supply side" transfer procedures do not seem to be responsive to the user context (Bikson, et al., 1984). Rather, these efforts appear to start with an information system into which the users' requirements are retrofit (Adam, 1975). The consensus of the findings from the empirical research is that interactive, two-way communications are required for effective information transfer (Bikson, et al., 1984).

Second, the **formal** part relies heavily on information intermediaries to complete the knowledge transfer process. However, a strong methodological base for measuring or assessing the effectiveness of the information intermediary is lacking (Beyer and Trice, 1982). In addition, empirical data on the effectiveness of information intermediaries and the role(s) they play in

knowledge transfer are sparse and inconclusive. The impact of information intermediaries is likely to be strongly conditional and limited to a specific institutional context.

According to Roberts and Frohman (1978), most Federal approaches to knowledge utilization have been ineffective in stimulating the diffusion of technological innovation. They claim that the numerous Federal STI programs are "highest in frequency and expense yet lowest in impact" and that Federal "information dissemination activities have led to little documented knowledge utilization." Roberts and Frohman also note that "governmental programs start to encourage utilization of knowledge only after the R&D results have been generated" rather than during the idea development phase of the innovation process. David (1986), Mowery (1983), and Mowery and Rosenberg (1979) conclude that successful [Federal] technological innovation rests more with the transfer and utilization of knowledge than with its production.

BACKGROUND

This research replicates, in large part, an earlier study that examined the preferences of readers concerning the format of NASA-authored technical reports The 1981 study included a survey of engineers and scientists at the NASA Langley Research Center (LaRC) and in academia and industry. The study was conducted to determine the opinions of readers concerning the format (organization) of NASA technical reports and usage of technical report components. A survey questionnaire was sent to 513 LaRC engineers and scientists and 600 engineers and scientists from three professional/technical societies. The response rates were 74% and 85%, respectively (Glassman and Cordle, 1982). The questionnaire contained 14 questions covering 12 survey topics which included the order in which users read report components, the components reviewed or read to determine whether to read a report, report components which could be deleted, the desirability of a table of contents, the desirability of both a summary and abstract, the location of the symbols list and glossary, the integration of illustrative material, the preferred format for reference citations, column layout and right margin treatment, and person/voice.

Conclusions were drawn from the 14 questions which were grouped into 12 survey topics. The results of the reader preference survey indicated that the conclusion was the component most often read by survey respondents. The summary, conclusion, abstract, title page, and introduction were the components used most frequently to determine if a report would actually be read. Participants in the 1981 study indicated that the summary as well as the abstract should be included, that the definition of symbols and glossary of terms should be located in the front of the report, and that illustrative material should be integrated with the text rather than grouped at the end of the report. Citation by number was the preferred format for references. A one-column, ragged right margin was preferred. Third person, passive voice was the style of writing preferred by the respondents.

RESULTS OF THE PHASE 1 READER PREFERENCE SURVEY

This research is a Phase 1 activity of the *NASA/DoD Aerospace Knowledge Diffusion Research Project*. (See Appendix A.) Survey participants consisted of NASA LaRC report producers (i.e., authors) and report users. Report producers were those individuals who had authored a NASA LaRC technical report in 1993 and 1994. Surveys were sent to 192 LaRC authors; 137 usable surveys were received. The response rate for the "internal" participants was 71%. Individuals on the supplemental distribution list NASA LaRC-authored reports formed the report user sample. Surveys were sent to 221 report users; 133 usable surveys were received. The response rate for the "external" participants was 60%. The surveys were conducted in March-April 1996 timeframe.

The 1981 questionnaire was modified slightly for use in this research. The 1996 instrument contained 16 questions concerned with the format of NASA LaRC-authored technical reports. An additional 15 questions, included in the questionnaire, pertained to the technical quality and accuracy of data contained in NASA LaRC-authored technical reports. The responses to these questions are not included in this report. The survey instrument is Appendix B.

Survey Demographics

The following "composite" participant profile was developed for the *internal* respondents: works in government (100%), has a master's degree (54%), performs duties as a researcher (84.7%), was educated as and works as an engineer (78.1%; 73.7%%), and is a male (83.9%). The following "composite" participant profile was developed for the *external* respondents: works in industry (100%); has a master's degree (41.4%); performs duties in design/development (27.1%), management/supervision (27%), and research (22.6%); was educated as and works as an engineer (81.2%;75.2%), and is a male (94.7%).

Order in Which Users Read or Review Report Components

Survey respondents were asked to use the technical report provided and to number a list of report components to indicate the chronological sequence in which these components are generally read. The question as it appeared in the questionnaire is shown below. Tables 1 and 2 summarize the responses of the *internal* and *external* respondents.

The format for a typical NASA LaRC technical report appears below. Please number IN ORDER, the components you generally read/review. (For example, if you read the "ABSTRACT" first, number it with a "1." Do not number those components you skip.

a._____Title Page
b._____Foreword
c._____Preface
d._____Contents
e._____Summary
f._____Introduction
g._____Symbols List
h._____Glossary of Terms
i._____Description of Research Procedure
j._____Results and Discussion
k._____Conclusions
l._____Appendixes
m.____References
n._____Tables
o._____Figures
p._____Abstract

Table 1. Order in Which LaRC-Authored Technical Report Components Are Read By **Internal** Respondents (n=137)

Response	Percentage of respondents indicating response																
Component	Don't Read	Read 1st	Read 2nd	Read 3rd	Read 4th	Read 5th	Read 6th	Read 7th	Read 8th	Read 9th	Read 10th	Read 11th	Read 12th	Read 13th	Read 14th	Read 15th	Read 16th
Title page	17.5	78.1	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Foreword	83.2	0.0	2.2	2.9	0.7	0.0	0.7	0.0	0.0	1.5	0.7	1.5	0.0	0.7	1.5	2.9	1.5
Preface	83.9	0.0	0.7	1.5	1.5	0.7	0.0	0.7	0.0	0.7	2.9	0.0	0.0	0.0	0.7	0.7	3.6
Table of contents	55.5	0.7	3.6	10.9	7.3	8.0	3.6	0.7	1.5	1.5	0.7	0.7	1.5	0.0	2.2	0.0	0.7
Summary	19.7	2.2	33.6	21.2	11.7	0.7	3.6	0.7	3.6	1.5	0.0	2.2	0.7	1.5	0.7	0.0	0.0
Introduction	8.8	0.0	6.6	26.3	19.7	18.2	5.8	5.8	2.9	2.9	2.9	0.7	0.0	0.0	0.7	0.0	0.0
Symbols list	51.8	0.0	0.0	0.0	3.6	5.1	6.6	5.8	4.4	4.4	1.5	6.6	4.4	4.4	2.2	0.0	0.0
Glossary of terms	67.2	0.0	0.0	0.0	0.7	0.7	2.9	3.6	0.7	0.7	2.2	2.2	7.3	4.4	2.9	0.7	1.5
Description of research procedure	14.6	0.0	0.0	2.9	10.9	17.5	18.2	18.2	8.0	2.2	3.6	2.2	0.7	0.0	0.7	0.0	0.0
Results and discussions	3.6	0.0	0.7	2.2	10.2	18.2	20.4	15.3	13.1	8.8	2.9	2.2	2.2	0.0	0.0	0.0	0.0
Conclusions	4.4	0.0	2.2	17.5	23.4	14.6	11.7	7.3	8.0	3.6	4.4	0.0	1.5	0.7	0.7	0.0	0.0
Appendixes	36.5	0.0	0.0	0.0	0.0	0.0	2.9	1.5	6.6	11.7	12.4	0.9	6.6	6.6	2.2	0.7	1.5
References	35.8	0.0	0.7	0.7	0.7	1.5	4.4	7.3	8.0	9.5	15.3	7.3	1.5	3.6	2.2	0.7	0.7
Tables	35.8	0.0	0.0	0.0	0.7	2.9	5.8	8.8	12.4	9.5	4.4	8.0	5.1	2.2	2.2	2.2	0.0
Figures	19.7	0.0	0.7	9.5	8.0	9.5	8.0	12.4	13.9	6.6	2.2	1.5	2.9	2.9	0.0	1.5	0.7
Abstract	24.8	19.0	45.3	4.4	0.0	0.7	0.0	1.5	0.0	0.7	0.7	0.7	0.0	1.5	0.0	0.0	0.7

Table 2. Order in Which LaRC-Authored Technical Report Components Are Read By **External** Respondents (n=133)

Response	Percentage of respondents indicating response																
Component	Don't Read	Read 1st	Read 2nd	Read 3rd	Read 4th	Read 5th	Read 6th	Read 7th	Read 8th	Read 9th	Read 10th	Read 11th	Read 12th	Read 13th	Read 14th	Read 15th	Read 16th
Title page	15.8	80.5	0.8	0.0	0.0	0.0	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.8
Foreword	60.2	0.8	12.0	7.5	1.5	2.3	2.3	0.8	0.8	0.0	0.0	0.8	3.0	1.5	1.5	1.5	3.8
Preface	66.2	0.0	1.5	8.3	5.3	2.3	1.5	2.3	0.8	0.0	0.0	0.0	2.3	3.0	0.8	5.3	0.8
Table of contents	42.1	0.8	3.8	9.0	12.8	6.0	7.5	3.8	1.5	1.5	2.3	0.0	1.5	2.3	3.0	0.0	2.3
Summary	15.0	3.0	27.1	20.3	14.3	9.8	6.0	2.3	0.8	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0
Introduction	23.3	0.8	6.8	15.8	16.5	12.8	9.0	7.5	3.0	1.5	1.5	0.8	0.0	0.8	0.0	0.0	0.0
Symbols list	71.4	0.0	0.0	0.0	2.3	1.5	0.8	1.5	1.5	2.3	3.8	1.5	3.8	2.3	5.3	2.3	0.0
Glossary of terms	72.9	0.0	0.0	0.0	0.0	2.3	0.8	0.8	0.8	1.5	3.0	3.0	2.3	3.8	2.3	3.8	2.3
Description of research procedure	39.8	0.0	0.0	1.5	5.3	9.0	12.8	8.3	6.8	9.8	3.8	2.3	0.8	0.0	0.0	0.0	0.0
Results and discussions	19.5	0.0	1.5	2.3	8.3	21.1	12.8	12.8	6.8	8.3	4.5	2.3	0.0	0.0	0.0	0.0	0.0
Conclusions	4.5	0.0	0.8	17.3	19.5	13.5	12.0	9.8	12.0	5.3	2.3	0.8	2.3	0.0	0.0	0.0	0.0
Appendixes	59.4	0.0	0.0	0.0	0.0	0.8	2.3	2.3	4.5	3.8	3.0	6.8	6.0	3.8	0.8	1.5	5.3
References	49.6	0.0	0.0	0.8	1.5	0.0	3.8	2.3	4.5	6.0	7.5	6.8	5.3	3.0	3.8	3.0	2.3
Tables	48.9	0.0	0.0	0.8	2.3	1.5	4.5	9.0	6.8	6.8	7.5	4.5	1.5	2.3	2.3	1.5	0.0
Figures	36.8	1.5	1.5	4.5	3.8	6.8	6.0	6.8	11.3	3.8	5.3	6.8	1.5	0.8	1.5	0.8	0.8
Abstract	18.0	12.8	43.6	11.3	3.8	1.5	0.0	1.5	1.5	0.8	0.0	0.8	1.5	0.8	0.8	0.0	1.5

Table 3. Percentage of Survey Respondents Who Read Various Langley-Authored Technical Report Components

Internal Survey (n = 137)		External Survey (n = 133)		Combined Surveys (n = 270)	
Component	Percentage who read	Component	Percentage who read	Component	Percentage who read
Title page	81.6	Title page	83.3	Title page	82.5
Abstract	74.3	Abstract	82.0	Abstract	78.2
Introduction	90.3	Introduction	75.8	Introduction	83.1
Table of contents	43.6	Table of contents	59.9	Table of contents	51.8
Conclusions	94.7	Conclusions	94.6	Conclusions	94.7
Foreword	15.9	Foreword	38.9	Foreword	27.4
Results and discussion	95.5	Results and discussion	79.6	Results and discussion	87.6
Description of research procedure	84.5	Description of research procedure	59.3	Description of research procedure	71.9
Preface	15.2	Preface	32.9	Preface	24.1
Figures	79.4	Figures	62.3	Figures	70.9
Symbols list	47.3	Symbols list	27.7	Symbols list	37.5
Glossary of terms	31.9	Glossary of terms	26.2	Glossary of terms	29.1
Tables	63.3	Tables	50.2	Tables	56.8
References	63.3	References	49.5	References	56.4
Appendixes	62.6	Appendixes	39.7	Appendixes	51.2
Summary	79.4	Summary	85.0	Summary	82.2

The data in Tables 1 and 2 were used to construct Table 3 which shows, for each component, the percentage of survey respondents who indicated they read that component at some stage in the use sequence. The report components are listed in Table 3 in descending frequency of use. For the *internal* respondents, the components read by the highest percentage of readers were the results and discussion and the conclusions Other components read by more than 80% of the internal respondents were the introduction, description of the research procedure, and the title page. For the *external* respondents, the components read by the highest percentage of readers were the conclusions and the summary. Other components read by more than 80% of the external respondents were the title page and the abstract. Components read by 80% of both groups were the conclusions (94.7%), results and discussion (87.6%), introduction (83.1%), title page (82.5%), and the summary (82.2%).

Conversely, certain components were read by very few respondents in either survey group. The foreword and preface had very low usage rates: *internal* respondents 15.9%/15.2 and *external* respondents 38.9%/32.9%. (With the exception of NASA Special Publications, NASA technical reports generally do not include a foreword or preface.) Other components read by less than half of both groups include preface (24.1%), foreword (27.4%), glossary of terms (29.1%), and the symbols list (37.5%).

To clarify sequence of use of report components, a weighted average ranking was calculated and is presented in Table 4. Weighted average rankings were used to determine the order of use of the 16 report components. The weighted average rankings were obtained by assigning weights based on specific order of use. A weight of 16 was assigned for the component read first, 15 for components read second, decreasing sequentially to 1 for components read sixteenth. The weighted was calculated by the formula

$$\frac{\sum n_i w_i}{n_t}$$

where ni was the number of users reading a component in the "ith" position, w_i was the weight assigned for the "ith" position, and n_t was the total number of users who read that component in any position.

When both groups were combined, the resulting mean sequence for the first six components read was title page, abstract, summary, introduction, conclusions, and table of contents. Examined separately, the internal and external groups showed the exact overall patterns in sequential positions. Although the abstract appears on the last page of a NASA report, this component was read by about 74% of the internal and 82% of the external respondents. Moreover, the abstract was the second report component read by both report producers and users.

Components Reviewed or read to Determine Whether to Read the Full Report

The respondents were asked to indicate which components (up to five) listed in Question 1 (see p. 9) were used to decide whether to read the report. Respondents were asked to indicate the order in which these components were read. Summaries of the results from the internal and external respondents are given in Tables 5 and 6, respectively.

Table 4. Weighted Average Ranking: Order in Which LaRC-Authored Technical Report Components Are Read

Internal Survey (n = 137)			External Survey (n = 133)			Combined Surveys (n = 270)		
Component	n	Weighted avg. rank*	Component	n	Weighted avg rank*	Component	n	Weighted avg. rank*
Title page	113	15.8	Title page	112	15.6	Title page	225	15.7
Abstract	103	14.5	Abstract	109	13.9	Abstract	212	14.2
Introduction	125	12.4	Introduction	102	12.2	Introduction	227	12.3
Table of contents	61	11.4	Table of contents	77	10.8	Table of contents	138	11.1
Conclusions	131	11.5	Conclusions	127	11.3	Conclusions	258	11.4
Foreword	23	7.8	Foreword	53	10.5	Foreword	76	9.7
Results and discussion	132	10.4	Results and discussion	107	10.6	Results and discussion	239	10.5
Description of research procedure	117	10.7	Description of research procedure	80	10.0	Description of research procedure	197	10.4
Preface	22	6.5	Preface	45	9.4	Preface	67	8.5
Figures	110	10.0	Figures	84	9.5	Figures	194	9.8
Symbols list	66	8.4	Symbols list	38	6.5	Symbols list	104	7.6
Glossary of terms	45	6.5	Glossary of terms	36	5.6	Glossary of terms	81	6.1
Tables	88	7.9	Tables	68	8.2	Tables	156	8.0
References	88	7.8	References	67	6.6	References	155	7.3
Appendixes	87	6.6	Appendixes	54	6.0	Appendixes	141	6.7
Summary	110	13.5	Summary	113	13.5	Summary	223	13.5

*Highest number indicates component was read first; lowest number indicates component was read last.

Table 5. Components Used by Internal Respondents to Decide Whether to Read a LaRC-Authored Technical Report (n=137)

Response / Component	Percentage of participants indicating response					
	Review 1st	Review 2nd	Review 3rd	Review 4th	Review 5th	Summation review 1st - 5th
Title page	57.7	0.0	0.0	0.0	0.0	57.7
Foreword	0.0	0.7	0.0	0.7	0.0	1.4
Preface	0.0	0.0	0.0	0.0	0.0	0.0
Table of contents	0.0	3.6	6.6	2.2	3.6	16.0
Summary	6.6	35.0	19.0	3.6	1.5	59.1
Introduction	0.0	6.6	18.2	14.6	7.3	46.7
Symbols list	0.0	0.0	0.0	0.7	0.0	0.7
Glossary of terms	0.0	0.0	0.0	0.7	0.7	1.4
Description of research procedure	0.0	1.5	3.6	6.6	5.1	16.8
Results and discussions	0.0	2.2	1.5	5.8	10.9	20.4
Conclusions	0.7	7.3	26.3	19.7	10.9	64.9
Appendixes	0.0	0.0	0.0	0.0	0.0	0.0
References	0.0	0.0	0.7	0.7	1.5	2.9
Tables	0.0	0.0	0.7	0.7	1.5	2.9
Figures	0.0	1.5	5.8	8.8	5.8	21.9
Abstract	32.8	37.2	2.2	0.7	0.7	73.6
None of the above components	2.2	4.4	15.3	0.7	50.4	0.7

Table 6. Components Used by External Respondents to Decide Whether to Read a LaRC-Authored Technical Report (n=133)

Response / Component	Percentage of participants indicating response					
	Review 1st	Review 2nd	Review 3rd	Review 4th	Review 5th	Summation review 1st - 5th
Title page	56.4	0.8	0.0	0.0	0.0	57.2
Foreword	0.8	2.3	3.0	0.8	2.3	9.2
Preface	0.0	2.3	0.0	0.8	0.8	3.9
Table of contents	0.8	1.5	6.0	3.8	2.3	14.4
Summary	11.3	26.3	20.3	7.5	2.3	67.7
Introduction	0.8	9.8	11.3	9.8	2.3	34.0
Symbols list	0.0	0.0	0.0	0.8	0.0	0.8
Glossary of terms	0.0	0.0	0.0	0.0	0.0	0.0
Description of research procedure	0.0	0.0	2.3	3.8	3.8	9.9
Results and discussions	0.0	3.0	6.8	5.3	8.3	23.4
Conclusions	0.0	9.8	18.0	14.3	15.8	57.9
Appendixes	0.0	0.0	0.0	0.0	0.0	0.0
References	0.0	0.0	0.0	0.8	0.8	1.6
Tables	0.0	0.0	0.8	0.0	1.5	1.5
Figures	2.3	3.0	6.0	4.5	3.0	18.8
Abstract	25.6	33.8	6.8	1.5	0.0	67.7
None of the above components	2.3	7.5	18.8	46.6	57.1	---

Table 7 lists the five components most frequently used by survey respondents in reviewing reports for possible reading and the percentage use by each group. Respondents from both groups identified the abstract (71.6%/67.7%) as the component most often reviewed to determine if a report would actually be read. The summary (65.7%) was the component utilized second (most often) by the respondents to the internal respondents as a screening tool. The conclusions (57.9%) was the component utilized second (most often) by the respondents to the external respondents as a screening tool. *Internal* respondents indicated the summary, title page, conclusions, and introduction (listed decreasing frequency of use) as the components most often reviewed to determine if a report would actually be read. *External* respondents indicated the conclusions, title page, summary, and introduction (listed decreasing frequency of use) as the components most often reviewed to determine if a report would actually be read.

Table 7. Components Most Commonly Used to Review/Read LaRC-Authored Technical Reports

Component	Percentage of respondents indicating use of a report component	
	Internal Survey n = 137	External Survey n = 133
Abstract	71.6	67.7
Summary	65.7	47.7
Title Page	57.7	57.2
Conclusions	54.9	57.9
Introduction	36.7	34.0

Table 8 gives a weighted average ranking for order of use of the five components most frequently reviewed in deciding whether to read a report. This table shows that the most common sequence used by combined surveys was: title page, abstract, summary, introduction, and conclusions. The use pattern for both internal and external groups was the same as that for the combined surveys (i.e., both internal and external users).

Report Components Which Could Be Deleted

Survey respondents were asked to list any NASA Langley-authored report components (up to five) that could be deleted. Table 9 contains a summary of the results tabulated for this question. The most dispensable components were thought to be the foreword and preface by both survey groups. About 70% and 64% of the internal respondents suggested deleting the preface and foreword, respectively. About 39% and 38% of the external respondents suggested the foreword and the preface as components that could be deleted. About 23% of the internal respondents indicated deleting the table of contents. On the other hand, only about 5% of the external respondents suggested that the table of contents could be deleted.

Table 8. Weighted Average Ranking: Order in Which Components Are Reviewed in Deciding Whether to Read a LaRC-Authored Technical Report

Internal Survey (n = 137)			External Survey (n = 133)			Combined Surveys (n = 270)		
Component	n	Weighted avg. rank*	Component	n	Weighted avg. rank*	Component	n	Weighted avg. rank*
Title page	113	15.8	Title page	112	15.6	Title page	225	15.7
Abstract	103	14.5	Abstract	109	13.9	Abstract	212	14.2
Summary	110	13.5	Summary	113	13.5	Summary	223	13.5
Introduction	125	12.4	Introduction	102	12.2	Introduction	227	12.3
Conclusions	131	11.5	Conclusions	127	11.3	Conclusions	258	11.4

*Highest number indicates component was read first; lowest number indicates component was read last.

Table 9. Opinions of Respondents Concerning Which Components Could Be Deleted from LaRC-Authored Technical Reports

	Percentage (number) of respondents suggesting deletion			
	Internal respondents (n = 137)		External respondents (n = 133)	
Component	%	n	%	n
Title page	1.5	2	0.8	1
Foreword	63.9	95	37.6	50
Preface	70.1	96	39.1	52
Table of contents	23.4	32	5.3	7
Summary	21.2	29	14.3	19
Introduction	0.0	0	1.5	2
Symbols list	6.6	9	9.8	13
Glossary of terms	28.5	39	12.8	17
Description of research procedure	0.0	0	3.0	4
Results and discussions	0.0	0	0.8	1
Conclusions	0.0	0	0.0	0
Appendixes	2.2	3	0.0	0
References	0.0	0	0.8	1
Tables	0.0	0	1.5	2
Figures	0.0	0	5.3	7
Abstracts	5.8	8	3.8	5
None	94.9	130	43.6	58

Desirability of a Table of Contents

Survey participants were asked a question concerning the need for and or desirability of a table of contents in NASA Langley-authored technical reports. Summaries of the results from the internal and external respondents are given in Table 10.

Table 10. Opinions of Respondents Concerning the Desirability of a Table of Contents in All LaRC-Authored Technical Reports

	Internal respondents (n = 137)		External respondents (n = 133)	
Response	%	n	%	n
Yes, all should	21.2	29	53.4	75
No, only long reports need it	78.8	108	46.6	58

About 21% of the internal respondents indicated that all NASA Langley-authored technical reports (regardless of length) should contain a table of contents; however, of the external respondents, 53.4% expressed the need for a table of contents in all NASA langley-authored technical reports. Thus, although about 79% of the internal respondents indicated that only long reports need a table of contents, about twice as many (53.4%) external (non-NASA Langley) respondents expressed the desire for this component in all NASA Langley-authored technical reports than did their internal counterparts.

Desirability of a Summary in Addition to an Abstract

Respondents were asked a question concerning the need for a summary (appearing in the front) in addition to the abstract, which appears as back matter on the Report Documentation Page (RDP) of NASA Langley-authored technical reports. Summaries of the results obtained from the internal and external respondents are given in Table 11.

Table 11. Opinions of Respondents Concerning the Desirability of a Summary in Addition to an Abstract in All LaRC-Authored Technical Reports

	Internal respondents (n = 137)		External respondents (n = 133)	
Response	%	n	%	n
Yes, include a summary, too	50.4	69	60.2	80
No, don't bother with it	49.6	68	39.8	53

Internal respondents were about evenly divided about whether the more detailed summary should be included in NASA Langley-authored technical reports in addition to the abstract. A slight majority (50.4%) favored inclusion of both components. Among external respondents, however, 60.2% indicated that NASA Langley-authored technical reports should have a summary in addition to an abstract.

Location of the Definition of Symbols and Glossary of Terms

Survey respondents were asked to indicate where in a NASA Langley-authored technical report the definition of symbols and glossary of terms components should appear. Summaries of the results from the internal and external respondents are given in Tables 12 and 13.

Table 12. Opinions of Respondents Concerning the Location of the Symbols List in LaRC-Authored Technical Reports

	Internal respondents (n = 137)		External respondents (n = 133)	
Response	%	n	%	n
After Contents	10.2	14	25.6	34
After Introduction	39.4	54	10.5	14
As an Appendix	13.9	19	19.5	26
Near front of report AND where symbols appear	15.3	21	20.3	27
Near back of report AND where symbols appear	5.8	8	10.5	14
NO Symbols List needed; just define the symbol where it appears in the report	15.3	21	13.5	18

Concerning the location of the Symbols List, the response patterns from the internal and external respondents were different. The largest percentage of internal (39.4%) and external (25.6%) respondents chose the response, "after Introduction" and "after Contents." The second highest percentages of both groups (15.3%) and (20.3%) chose "near front of report AND where symbols appear." Thus, when results from these two responses were combined, a preference (64.9% for internal respondents and 56.4% for external respondents) was evident for the Definition of Terms to be located near the front of the report as opposed to being located as back matter.

Regarding the location of the Glossary of Terms, the response patterns from the internal and external respondents were different. The largest percentage of the internal (46.7%) respondents selected "no glossary of terms needed; just define the term where it appears in the report." The largest percentage of external respondents (30.8%) chose the response, "as an Appendix." The

Table 13. Opinions of Respondents Concerning the Location of the Glossary of Terms in LaRC-Authored Technical Reports

Response	Internal respondents (n = 137)		External respondents (n = 133)	
	%	n	%	n
After Contents	4.4	6	15.0	20
After Introduction	7.3	10	3.8	5
As an Appendix	24.8	34	30.8	41
Near front of report AND where terms appear	9.5	13	11.3	15
Near back of report AND where terms appear	7.3	10	12.8	17
NO Glossary of Terms needed; just define the term where it appears in the report	46.7	64	26.3	35

second highest percentage (24.8%) of the internal respondents and external respondents (15%) chose "after Contents." Thus, when results from these two responses were combined, a preference (32.1% for internal respondents and 43.6% for external respondents) was evident for the glossary of terms to be located near the back of the report as opposed to being located as front matter.

When Appendix Material Is Read

Survey respondents were asked a question concerning when they read appendix material—before, with, or after the text. Summaries of the results from the internal and external respondents are given in Table 14.

Table 14. When Respondents Usually Read Appendix Material in LaRC-Authored Technical Reports

Response	Internal respondents (n = 137)		External respondents (n = 133)	
	%	n	%	n
Before the text	2.2	3	0.0	0
With the text	24.8	34	23.3	31
After the text	73.0	100	76.7	102

The internal and external responses were very similar. A strong majority (73% internally and about 77% externally) indicated that the appendixes were read after the text. About 25% of the internal respondents and about 23% of the external respondents stated that the appendixes were read with the text. About 2% of the internal and 0.0% of the external respondents indicated that the appendix material was read prior to reading the text.

Location and Use of Illustrative Material

Internal and external respondents were asked three questions concerning the location and use of illustrative material (such as tables, graphs, and photographs) in NASA Langley-authored technical reports. A summary of the results from the internal and external respondents is presented in Tables 15, 16, 17, and 18.

About 47% of the internal and about 36% of the external respondents indicated that a list of figures or tables should ONLY be included in NASA Langley-authored technical reports when there is a lot of illustrative material (e.g., over 10 figures, photos, or tables). About 34% of the internal respondents and about 29% of the external respondents reported that "No List of Figures and Tables Needed" in NASA Langley-authored technical reports. About 22% of external respondents indicated that NASA Langley-authored technical reports should always contain a list of figures or tables whenever a report contains illustrative material.

Table 15. Opinions of Respondents Concerning the Need for a List of Figures or Tables in LaRC-Authored Technical Reports

	Internal respondents (n = 137)		External respondents (n = 133)	
Response	%	n	%	n
Only when illustrative material is integrated with the text	4.4	6	6.8	9
Only when illustrative material is separate from the text; at the end of the report	5.8	8	6.0	8
Only when there is a lot of illustrative material (e.g., over 10 figures, photos or tables)	47.4	65	36.1	48
Always; whenever a report contains illustrative material	8.0	11	21.8	29
No List of Figures and Tables needed	34.3	47	29.3	39

Internal and external respondents were asked about the integration of illustrative material as opposed to group it at the end of the report (Table 16). The survey results show that about 77% of the internal and about 80% of the external respondents preferred that the illustrative material be integrated with the text as opposed to being grouped in the back matter.

Table 16. Opinions of Respondents Concerning Integration of Illustrative Material in LaRC-Authored Technical Reports

Response	Internal respondents (n = 137)		External respondents (n = 133)	
	%	n	%	n
Integrated with text	77.4	106	79.7	106
Separate from text; at end of report	22.6	31	20.3	27

Table 17 contains the responses to the third question concerning the placement of illustrative material. About 31% of the internal and about 50% of the external respondents indicated that integration of tables and figures did not interrupt their reading no matter how much illustrative material the report contained. The illustrative-page/text-page ratio which interrupted reading was placed at two by about 49% of the internal respondents and about 35% of the external respondents; at three by about 14% of internal and 9% of external respondents; and at four or more by about 6% of internal and 6% of external respondents.

Table 17. Opinions of Respondents Concerning the Amount of Illustrative Material That Can be Integrated with the Text of LaRC-Authored Technical Reports Without Interrupting the Reader

Response	Internal respondents (n = 137)		External respondents (n = 133)	
	%	n	%	n
Yes, when there are two pages of illustrative material for every page of text	48.9	67	35.3	47
Yes, when there are three pages of illustrative material for every page of text	13.9	19	9.0	12
Yes, when there are four or more pages of illustrative material for every page of text	5.8	8	6.0	8
No, I always prefer to have illustrative material integrated in text	31.4	43	49.6	66

Finally, respondents were asked when they read the illustrative included in NASA Langley-authored technical reports. Summaries of the internal and external responses are presented in Table 18.

Table 18. When Respondents Usually Read Illustrative Material in LaRC-Authored Technical Reports

	Internal respondents (n = 137)		External respondents (n = 133)	
Response	%	n	%	n
Before the text	16.8	23	18.0	24
With the text	80.3	110	79.7	106
After the text	2.9	4	2.3	3

Most respondents (80.3% internally; 79.7% externally) indicated that the illustrative material was read with the text. Some respondents (16.% internally and 18% externally) indicated that the illustrative material was read before the text. Only a few respondents (4% internally and 2.3% externally) indicated that the illustrative material was read after the text.

Format of Reference Citations

Survey respondents were asked to specify their preference between three formats for reference citations in NASA Langley-authored technical reports. Summaries of the internal and external respondents' responses are presented in Table 19.

Table 19. Preferences of Respondents Concerning the Format of Reference Citations Used in LaRC-Authored Technical Reports

	Internal respondents (n = 137)		External respondents (n = 133)	
Response	%	n	%	n
Cited in text by author/year (e.g., Jones 1978) but with an alphabetic list in back of report	27.7	38	27.8	37
Cited in text by number (e.g., reference 16) with a numbered list in back of report	52.6	72	55.6	74
Cited in text by footnote (e.g., Jones[12]) with a numbered list in back of report	19.7	27	16.5	22

About 53% of the internal respondents and about 56% of the external respondents preferred references in the text to be cited by number (e.g., reference 16) with a numbered list in back of report. About 28% of the internal respondents and about 28% of the external respondents preferred references cited in text by author/year (e.g., Jones 1978) but with an alphabetic list in back of report. About 20% of the internal respondents and about 17% of the external respondents preferred references cited in text by footnote (e.g., Jones[12]) with a numbered list in back of report.

Specifications of Units for Dimensional Values

Respondents were asked to specify their preferences regarding the use of the International System (S.I.) units and U.S. Customary units for dimensional values in NASA Langley-authored technical reports. Table 20 contains the results of the survey responses concerning this question.

Table 20. Preferences of Respondents Concerning Units for Dimensional Values Specified in LaRC-Authored Technical Reports

Response	Internal respondents (n = 137)		External respondents (n = 133)	
	%	n	%	n
The International System (S.I.) units (e.g., meter, kilogram)	24.1	33	26.3	36
U.S. Customary units (e.g., foot, pound)	38.0	52	22.6	30
S.I. units with U.S. Customary units in parentheses	15.3	21	18.8	25
U.S. Customary units with S.I. units in parentheses	22.6	31	32.3	42

There was no overall agreement among either survey groups as to how dimensional values should be specified in NASA Langley-authored technical reports. Thirty-eight percent of the internal respondents selected U.S. Customary units (e.g., foot, pound) followed by the International System (S.I.) units (24.1%), and U.S. Customary units with S.I. units in parentheses (e.g., meter, kilogram) (22.6%). About 32% of the external respondents selected U.S. Customary units with S.I. units in parentheses, followed by the International System (S.I.) units (e.g., meter, kilogram) (26.3%), and U.S. Customary units (e.g., foot, pound) (22.6%).

Column Layout and Right margin Treatment

Respondents were asked to state their preferences concerning one or two column layouts and ragged or justified right margins. Table 21 summarizes the results of survey respondents.

Table 21. Preferences of Respondents Concerning Column Layout and Right Margin Treatment in LaRC-Authored Technical Reports

Response	Internal respondents (n = 137)		External respondents (n = 133)	
	%	n	%	n
Two columns; justified right margin	40.9	56	24.1	32
Two columns; ragged right margin	8.0	11	6.0	8
One column; justified right margin	12.4	17	33.8	45
One column; ragged right margin	17.5	24	17.3	23
Mixed format; one and two columns intermixed as mathematical material dictates	21.2	29	18.8	25

About 41% of the internal respondents preferred two columns; justified right margin, followed by a mixed format; one and two columns intermixed as mathematical material dictates (21.2%). About 34% of the external respondents preferred one column; justified right margin followed by two columns; justified right margin (24.1%). Overall, a two column format (48.9%) was preferred by internal respondents and a one column format was preferred by external respondents (51.1%). Justified right margins were preferred over ragged right margins by about 53% of the internal respondents and about 63% of the external respondents.

Person and Voice

Survey respondents were asked to specify their preference in regard to person and voice in NASA Langley-authored technical reports. Table 22 summarizes the results of the internal and external respondents.

Table 22. Preferences of Respondents Concerning Person and Voice for LaRC-Authored Technical Reports

Response	Internal respondents (n = 137)		External respondents (n = 133)	
	%	n	%	n
Passive voice, third person	64.2	88	47.4	63
Active voice, third person	14.6	20	17.3	23
Active voice, first person	21.2	29	35.3	47

Among both groups, the passive voice, third person option was chosen most often as the preferred writing style. Among internal respondents, about 64% selected this preference. Among external respondents, about 47% selected this preference. Considering voice alone, internal respondents preferred the passive voice (64%) over the active voice (35%). On the other hand, external respondents preferred the active voice (53%) over the passive voice (47%).

The majority of both internal (78.8%) and external (64.7%) respondents preferred that third person be used rather than first person in NASA Langley-authored technical reports. It should be noted, however, that a higher percentage of external respondents (35.3%) preferred first person than did the internal group (21.2%).

FINDINGS

Order in Which Users Read or Review Report Components

For the *internal* respondents, the components read by the highest percentage of readers were the results and discussion and the conclusions Other components read by more than 80% of the internal respondents were the introduction, description of the research procedure, and the title page. For the *external* respondents, the components read by the highest percentage of readers were the conclusions and the summary. Other components read by more than 80% of the external respondents were the title page and the abstract. Components read by 80% of both groups were the conclusions (94.7%), results and discussion (87.6%), introduction (83.1%), title page (82.5%), and the summary (82.2%).

When both groups were combined, the resulting mean sequence for the first six components read was title page, abstract, summary, introduction, conclusions, and table of contents. Examined separately, the internal and external groups showed the exact overall patterns in sequential positions. Although the abstract appears on the last page of a NASA report, this component was read by about 74% of the internal and 82% of the external respondents. Moreover, the abstract was the second report component read by both report producers and users.

Components Reviewed or Read to Determine Whether to Read the Entire Report

Respondents from both groups identified the abstract (71.6%/67.7%) as the component most often reviewed to determine if a report would actually be read. The summary (65.7%) was the component utilized second (most often) by the respondents to the internal respondents as a screening tool. The conclusions (57.9%) was the component utilized second (most often) by the respondents to the external respondents as a screening tool. *Internal* respondents indicated the summary, title page, conclusions, and introduction (listed decreasing frequency of use) as the components most often reviewed to determine if a report would actually be read. *External* respondents indicated the conclusions, title page, summary, and introduction (listed decreasing frequency of use) as the components most often reviewed to determine if a report would actually be read.

Components Which Could be Deleted

The most dispensable components were thought to be the foreword and preface by both survey groups. About 70% and 64% of the internal respondents suggested deleting the preface and foreword, respectively. About 39% and 38% of the external respondents suggested the foreword and the preface as components that could be deleted. About 23% of the internal respondents indicated deleting the table of contents. On the other hand, only about 5% of the external respondents suggested that the table of contents could be deleted.

Desirability of a Table of Contents

About 21% of the internal respondents indicated that all NASA Langley-authored technical reports (regardless of length) should contain a table of contents; however, of the external respondents, 53.4% expressed the need for a table of contents in all NASA langley-authored technical reports. Thus, although about 79% of the internal respondents indicated that only long reports need a table of contents, about twice as many (53.4%) external (non-NASA Langley) respondents expressed the desire for this component in all NASA Langley-authored technical reports than did their internal counterparts.

Desirability of a Summary in Addition to an Abstract

Internal respondents were about evenly divided about whether the more detailed summary should be included in NASA Langley-authored technical reports in addition to the abstract. A slight majority (50.4%) favored inclusion of both components. Among external respondents, however, 60.2% indicated that NASA Langley-authored technical reports should have a summary in addition to an abstract.

Location of the Definition of Symbols and Glossary of Terms

Concerning the location of the Symbols List, the response patterns from the internal and external respondents were different. The largest percentage of internal (39.4%) and external (25.6%) respondents chose the response, "after Introduction" and "after Contents." The second highest percentages of both groups (15.3%) and (20.3%) chose "near front of report AND where symbols appear." Thus, when results from these two responses were combined, a preference (64.9% for internal respondents and 56.4% for external respondents) was evident for the Definition of Terms to be located near the front of the report as opposed to being located as back matter.

Regarding the location of the Glossary of Terms, the response patterns from the internal and external respondents were different. The largest percentage of the internal (46.7%) respondents selected "no glossary of terms needed; just define the term where it appears in the report." The largest percentage of external respondents (30.8%) chose the response, "as an Appendix." The second highest percentage (24.8%) of the internal respondents and external respondents (15%) chose "after Contents." Thus, when results from these two responses were combined, a

preference (32.1% for internal respondents and 43.6% for external respondents) was evident for the glossary of terms to be located near the back of the report as opposed to being located as front matter.

When Appendix Material Is Read

The internal and external responses were very similar. A strong majority (73% internally and about 77% externally) indicated that the appendixes were read after the text. About 25% of the internal respondents and about 23% of the external respondents stated that the appendixes were read with the text. About 2% of the internal and 0.0% of the external respondents indicated that the appendix material was read prior to reading the text.

Location and Use of Illustrative Material

About 77% of the internal and about 80% of the external respondents preferred that the illustrative material be integrated with the text as opposed to being grouped in the back matter. Most respondents (80.3% internally; 79.7% externally) indicated that the illustrative material was read with the text. Some respondents (16.% internally and 18% externally) indicated that the illustrative material was read before the text. Only a few respondents (4% internally and 2.3% externally) indicated that the illustrative material was read after the text.

Format of Reference Citations

About 53% of the internal respondents and about 56% of the external respondents preferred references in the text to be cited by number (e.g., reference 16) with a numbered list in back of report. About 28% of the internal respondents and about 28% of the external respondents preferred references cited in text by author/year (e.g., Jones 1978) but with an alphabetic list in back of report. About 20% of the internal respondents and about 17% of the external respondents preferred references cited in text by footnote (e.g., Jones[12]) with a numbered list in back of report.

Specifications of Units for Dimensional Values

There was no overall agreement among either survey groups as to how dimensional values should be specified in NASA Langley-authored technical reports. Thirty-eight percent of the internal respondents selected U.S. Customary units (e.g., foot, pound) followed by the International System (S.I.) units (24.1%), and U.S. Customary units with S.I. units in parentheses (e.g., meter, kilogram) (22.6%). About 32% of the external respondents selected U.S. Customary units with S.I. units in parentheses, followed by the International System (S.I.) units (e.g., meter, kilogram) (26.3%), and U.S. Customary units (e.g., foot, pound) (22.6%).

Column Layout and Right Margin Treatment

About 41% of the internal respondents preferred two columns; justified right margin, followed by a mixed format; one and two columns intermixed as mathematical material dictates (21.2%). About 34% of the external respondents preferred one column; justified right margin followed by two columns; justified right margin (24.1%). Overall, a two column format (48.9%) was preferred by internal respondents and a one column format was preferred by external respondents (51.1%). Justified right margins were preferred over ragged right margins by about 53% of the internal respondents and about 63% of the external respondents.

Person and Voice

Among both groups, the passive voice, third person option was chosen most often as the preferred writing style. Among internal respondents, about 64% selected this preference. Among external respondents, about 47% selected this preference. Considering voice alone, internal respondents preferred the passive voice (64%) over the active voice (35%). On the other hand, external respondents preferred the active voice (53%) over the passive voice (47%).

The majority of both internal (78.8%) and external (64.7%) respondents preferred that third person be used rather than first person in NASA Langley-authored technical reports. It should be noted, however, that a higher percentage of external respondents (35.3%) preferred first person than did the internal group (21.2%).

CONCLUDING REMARKS

The survey results reported in this report relate only to the format for NASA Langley Research Center technical reports. However, the results may also be applicable for other technical reports that record significant scientific and technical accomplishments and that are prepared for external distribution. The results support the position that the technical report reading preferences of producers (writers) differ from the reading preferences of report users. What would account for the differences assuming, of course, that the data accurately reflect the reading habits of the two groups? One possibility is that the two groups do indeed have different reading habits. Another possibility is that the self reported practices do not accurately represent the actual reading practices of report producers and users. More empirical study is needed to validate the findings. Nevertheless, the data offer useful insights into the reading preferences of aerospace engineers and scientists concerning the organization, format, layout, and language of NASA Langley Research Center technical reports. These findings may also be useful for editors and document designers, especially those involved in designing electronic publications.

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APPENDIX A

NASA/DoD AEROSPACE KNOWLEDGE DIFFUSION RESEARCH PROJECT

Fact Sheet

The process of producing, transferring, and using scientific and technical information (STI), which is an essential part of aerospace research and development (R&D), can be defined as *Aerospace Knowledge Diffusion.* Studies tell us that timely access to STI can increase productivity and innovation and help aerospace engineers and scientists maintain and improve their professional skills. These same studies indicate, however, that we know little about aerospace knowledge diffusion or about how aerospace engineers and scientists find and use STI. To learn more about this process, we have organized a research project to study knowledge diffusion. Sponsored by NASA and the Department of Defense (DoD), the *NASA/DoD Aerospace Knowledge Diffusion Research Project* is being conducted by researchers at the NASA Langley Research Center, the Indiana University Center for Survey Research, and Rensselaer Polytechnic Institute. This research is endorsed by several aerospace professional societies including the AIAA, RAeS, and DGLR and has been sanctioned by the AGARD and AIAA Technical Information Panels.

This 4-phase project is providing descriptive and analytical data about the flow of STI at the individual, organizational, national, and international levels. It is examining both the channels used to communicate STI and the social system of the aerospace knowledge diffusion process. Phase 1 investigates the information-seeking habits and practices of U.S. aerospace engineers and scientists, in particular their use of government-funded aerospace STI. Phase 2 examines the industry-government interface and emphasizes the role of the information intermediary in the knowledge diffusion process. Phase 3 concerns the academic-government interface and emphasizes the information intermediary-faculty-student interface. Phase 4 explores the information-seeking behaviors of non-U.S. aerospace engineers and scientists from Western European nations, India, Israel, Japan, and the former Soviet Union.

The results of this research project will help us to understand the flow of STI at the individual, organizational, national, and international levels. The findings can be used to identify and correct deficiencies; to improve access and use; to plan new aerospace STI systems; and should provide useful information to R&D managers, information managers, and others concerned with improving access to and utilization of STI. These results will contribute to increasing productivity and to improving and maintaining the professional competence of aerospace engineers and scientists. The results of our research are being shared freely with those who participate in the study.

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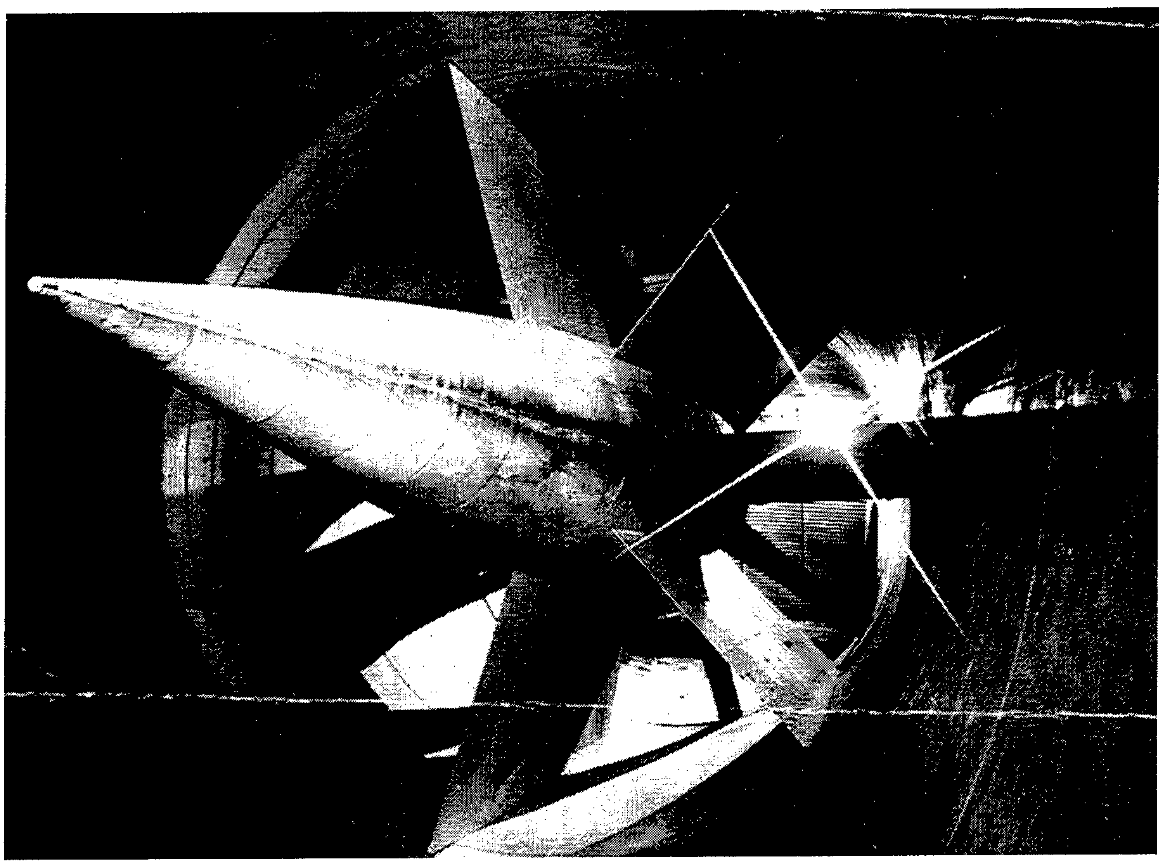
APPENDIX B: SURVEY

PHASE 1 OF THE
NASA/DOD AEROSPACE KNOWLEDGE
DIFFUSION RESEARCH PROJECT

Technical Communications in Aerospace:
The Role of the Technical Report in Aerospace Knowledge Diffusion



SPONSORED BY THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AND THE DEPARTMENT OF DEFENSE WITH THE COOPERATION OF INDIANA UNIVERSITY AND THE AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS (AIAA)

These questions are designed to determine how NASA Langley Research Center (LaRC) technical reports are read and the preferred format of our readers.

1. The format for a typical NASA LaRC technical report appears below. Please number IN ORDER the components you generally read/review. (For example, if you read the "ABSTRACT" first, number it with a "1.") Do not number those components you skip.

   a. _____ Title Page
   b. _____ Foreword
   c. _____ Preface
   d. _____ Contents
   e. _____ Summary
   f. _____ Introduction
   g. _____ Symbols List
   h. _____ Glossary of Terms
   i. _____ Description of Research Procedure
   j. _____ Results and Discussions
   k. _____ Conclusions
   l. _____ Appendixes
   m. _____ References
   n. _____ Tables
   o. _____ Figures
   p. _____ Abstract

2. Referring to the list in Question 1, which NASA LaRC technical report components do you review or read to determine if you will actually READ THE REPORT? (Please list letter from the above (Q.1) in the order you review them.)

_______	_______	_______	_______	_______
review first	review second	review third	review fourth	review fifth

3. In your opinion, which of the above technical report components listed in Q.1 could be deleted?

   _______ _______ _______ _______ _______

4. Should ALL NASA LaRC technical reports have a Contents (regardless of length of report)? (Circle number)

   1. Yes, all should
   2. No, only long reports need it

5. Given that NASA LaRC technical reports contain a brief abstract (about 200 words) in the back, do you also need the more detailed summary section (which appears in the front)? (Circle number)

   1. Yes, include a summary, too
   2. No, don't bother with it

6. Where in a NASA LaRC technical report should the Symbols List appear? (Circle ONLY one number)

    1. After Contents
    2. After Introduction
    3. As an Appendix
    4. Near front of report AND where symbols or terms appear
    5. Near back of report AND where symbols or terms appear
    6. NO Symbols List needed; just define the symbol or term where it appears in the report

7. Where in a NASA LaRC technical report should the Glossary of Terms appear? (Circle ONLY one number)

    1. After Contents
    2. After Introduction
    3. As an Appendix
    4. Near front of report AND where terms appear
    5. Near back of report AND where terms appear
    6. NO Glossary of Terms needed; just define the term where it appears in the report

8. When Appendixes appear in a technical report, when do you usually read them? (Circle ONLY one number)

    1. Before the text
    2. With the text
    3. After the text

9. When should NASA LaRC technical reports have a list of figures and tables? (Circle ONLY ONE number)

    1. Only when illustrative material is integrated with the text
    2. Only when illustrative material is separate from the text; at the end of the report
    3. Only when there is a lot of illustrative material (e.g., over 10 figures, photos, or tables)
    4. Always; whenever a report contains illustrative material
    5. NO list of figures and tables needed

10. Where do you prefer illustrative material (tables, graphs, and photographs) to appear?

    1. Integrated with the text
    2. Separate from text; at end of report

11. If illustrative material is integrated in a technical report, is there a point at which the material interrupts your reading? (Circle ONLY one number)

    1. Yes, when there are two pages of illustrative material for each page of text
    2. Yes, when there are three pages of illustrative material for each page of text
    3. Yes, when there are four or more pages of illustrative material for each page of text
    4. No, I always prefer to have the illustrative material integrated in the text

12. When do you usually read the illustrative material in a technical report? (Circle ONLY one number)

1. Before the text
2. With the text
3. After the text

13. Which form of reference citation do you prefer for technical reports? (Circle ONLY one number)

1. Cited in text by author/year (e.g., Jones 1978) with an alphabetical list in back of report
2. Cited in text by number (e.g., reference 16) with a numbered list in back of report
3. Cited in text by footnote (e.g., Jones[12]) with a numbered list in back of report

14. How do you prefer to have dimensional values specified in technical reports? (Circle ONLY one number)

1. The International System (S.I.) units (e.g., meter, kilogram)
2. U.S. Customary Units (e.g., foot, pound)
3. S.I. units with U.S. Customary units in parentheses
4. U.S. Customary Units with S.I. units in parentheses

15. Which of the following forms of layout do you prefer for technical reports? (Circle ONLY one number)

1. Two columns; justified right margin
2. Two columns; ragged right margin
3. One column; justified right margin
4. One column; ragged right margin
5. Mixed format; one and two columns intermixed as mathematical material dictates

16. Which of the following writing styles do you prefer for technical reports? (Circle ONLY one number)

1. Passive voice, third person (e.g., Some success has been achieved by using empirical methods.)
2. Active voice, third person (e.g., With empirical methods, investigators have achieved some success.)
3. Active voice, first person (e.g., With empirical methods, we have achieved some success.)

Please tell us about your use of and your opinion(s) regarding NASA LaRC technical reports.

17. Do you use NASA LaRC technical reports in performing your present professional duties? (Circle number)

1. Yes ⟶ Go to Q. 19
2. No ⟶ Go to Q. 18

18. Why don't you use NASA LaRC technical reports? (Circle ALL that apply)

NASA LaRC technical reports are ...

1. Not available/accessible
2. Not relevant to my research
3. Not used in my discipline
4. Not reliable/technically inaccurate
5. Not timely/current
6. Other (please specify) ____________________

(1–5) → Go to Q. 25

19. Which, if any, of the following problems have you encountered when using NASA LaRC technical reports? (Circle ALL that apply)

1. The time and effort it took to locate the report
2. The time and effort it took to physically obtain the report
3. The accuracy, precision, and reliability of the results
4. The legibility or readability of the results
5. The organization of the results
6. The distribution limitations or security restrictions of the report

20. In terms of performing your present professional duties, how important are NASA LaRC technical reports? (Circle number)

Not at all Important 1 2 3 4 5 Very Important

21. How often do you find out about NASA LaRC technical reports from each of these sources? (Circle number)

	Never	Seldom	Sometimes	Frequently
Bibliographic data base search	1	2	3	4
Announcement journal (e.g., *STAR*)	1	2	3	4
Current awareness publication (e.g., *SCAN*)	1	2	3	4
Cited in a report/journal/conference paper	1	2	3	4
Referred to me by a colleague	1	2	3	4
Referred to me by a librarian/technical information specialist	1	2	3	4
Routed to me by my library	1	2	3	4
By intentional search of library resources	1	2	3	4
By accident, by browsing, or looking for other material	1	2	3	4
NASA LaRC sends them to me	1	2	3	4
The author sends them to me	1	2	3	4
Other (please specify) ____________________	1	2	3	4

22. How often do you physically obtain NASA LaRC technical reports from each of these sources? (Circle number)

	Never	Seldom	Sometimes	Frequently
NASA LaRC sends them to me	1	2	3	4
The author sends them to me	1	2	3	4
I request them from the author	1	2	3	4
I download them from the Internet	1	2	3	4
I request/order them from my library	1	2	3	4
I get them from a colleague	1	2	3	4
They are routed to me by my library	1	2	3	4
Other (please specify) ______________	1	2	3	4

23. If you were deciding whether or not to use NASA LaRC technical reports in your work, how important would the following factors be? (Circle appropriate number)

	Very Unimportant				Very Important
Are easy to physically obtain	1	2	3	4	5
Are easy to use or read	1	2	3	4	5
Are inexpensive	1	2	3	4	5
Have good technical quality	1	2	3	4	5
Have comprehensive data and information	1	2	3	4	5
Are relevant to my work	1	2	3	4	5
Can be obtained at a nearby location or source	1	2	3	4	5
Had good prior experience using them	1	2	3	4	5

24. How would you rate NASA LaRC technical reports on each of the following characteristics? (Circle number)

	No Opinion	Poor	Fair	Good	Excellent
Quality of information	1	2	3	4	5
Precision/accuracy of data	1	2	3	4	5
Adequacy of data/documentation	1	2	3	4	5
Organization/format	1	2	3	4	5
Quality of graphics (e.g., charts, photos, figures)	1	2	3	4	5
Timeliness/currency	1	2	3	4	5
"Advancing the state of the art" in your discipline	1	2	3	4	5

25. (Even if you don't use them...) What is your opinion of NASA LaRC technical reports? (Circle number)

They are difficult to physically obtain	1	2	3	4	5	They are easy to physically obtain
They are difficult to use or read	1	2	3	4	5	They are easy to use or read
They are expensive	1	2	3	4	5	They are inexpensive
They are of poor technical quality	1	2	3	4	5	They are of good technical quality
They have incomplete data and information	1	2	3	4	5	They have comprehensive data and information
They are irrelevant to my work	1	2	3	4	5	They are relevant to my work
They must be obtained at a distant location or source	1	2	3	4	5	They can be obtained at a nearby location or source
I've had bad prior experiences using them	1	2	3	4	5	I've had good prior experiences using them
They are outdated by the time I receive them	1	2	3	4	5	They are current when I receive them

26. When compared with other technical report literature in my discipline, the prestige of Langley-authored technical reports is: (Circle number)

Inferior 1 2 3 4 5 Superior 6 Don't Know 9 Don't Use Them

27. When compared with other technical report literature in my discipline, the adequacy of data in Langley-authored technical reports is: (Circle number)

Inferior 1 2 3 4 5 Superior 6 Don't Know 9 Don't Use Them

28. When compared with other technical report literature in my discipline, the organization (format) of Langley-authored technical reports is: (Circle number)

Inferior 1 2 3 4 5 Superior 6 Don't Know 9 Don't Use Them

29. When compared with other technical report literature in my discipline, the quality of visual presentations (e.g., graphics, photography, type style) in Langley-authored technical reports is: (Circle number)

Inferior 1 2 3 4 5 Superior 6 Don't Know 9 Don't Use Them

30. In terms of "advancing the state of the art" in my discipline, Langley-authored technical reports are: (Circle number)

Inferior 1 2 3 4 5 Superior 6 Don't Know 9 Don't Use Them

31. How likely are you to use the electronic versions of NASA LaRC technical reports available on the Internet from the Langley Technical Report Server (LTRS)? (Circle number)

Not at all Likely 1 2 3 4 5 Very Likely 7 Already Use It

32. How likely would you be to use the electronic versions of NASA LaRC technical reports if available on CD-ROM? (Circle number)

Not at all Likely 1 2 3 4 5 Very Likely

We're asking a few questions for AIAA.

33. Are you are an AIAA member? (Circle number)

1. Yes ⟶ Go to Q. 34
2. No ⟶ Go to Q. 41

34. How important were the following in making your decision to join AIAA? (Circle Number)

	Least Important				Most Important
1 Professional development	1	2	3	4	5
2. Technical information	1	2	3	4	5
3. Networking	1	2	3	4	5
4. Conferences	1	2	3	4	5
5. Publications	1	2	3	4	5
6. Corporate membership	1	2	3	4	5
7. Membership benefits	1	2	3	4	5
8. Other (please specify)	1	2	3	4	5

35. In terms of your professional development, how important are the following AIAA products and services? (Circle Number)

	Least Important				Most Important
1. Conferences	1	2	3	4	5
2. Journals	1	2	3	4	5
3. *Aerospace America*	1	2	3	4	5
4. Committees	1	2	3	4	5
5. Local sections	1	2	3	4	5
6. International activities	1	2	3	4	5
7. Continuing education courses	1	2	3	4	5
8. Membership benefits	1	2	3	4	5
9. Corporate sponsorship benefits	1	2	3	4	5
10. Books	1	2	3	4	5
11. Document delivery	1	2	3	4	5
12. Other (please specify)	1	2	3	4	5

36. How effective are the following communications in informing you about upcoming AIAA conference? (Circle Number)

	Not At All Effective				Very Effective
1. Call for Papers	1	2	3	4	5
2. Advertising in AIAA publications	1	2	3	4	5
3. Advertising in non-AIAA publications	1	2	3	4	5
4. Direct mail	1	2	3	4	5
5. The Internet	1	2	3	4	5
6. *Aerospace America*	1	2	3	4	5
7. *AIAA Bulletin*	1	2	3	4	5

37. How effective are the following communications in informing you about new AIAA information products such as new book titles? (Circle Number)

	Not At All Effective				Very Effective
1. Advertising in AIAA publications	1	2	3	4	5
2. Advertising in non-AIAA publications	1	2	3	4	5
3. Direct mail	1	2	3	4	5
4. The Internet	1	2	3	4	5
5. *Aerospace America*	1	2	3	4	5

38. Considering the last AIAA conference you attended, how important were each of the following factors in making your decision to attend? (Circle Number)

	Least Important				Most Important
1. The opportunity for professional development	1	2	3	4	5
2. Encouragement (i.e., monetary support) from my employer	1	2	3	4	5
3. The exhibits	1	2	3	4	5
4. I could combine conference attendance with my vacation	1	2	3	4	5
5. The location (i.e. city) of the conference	1	2	3	4	5
6. Conference agenda/content	1	2	3	4	5
7. The opportunity to network	1	2	3	4	5
8. The caliber and selection of the speakers	1	2	3	4	5
9. The committee meetings	1	2	3	4	5
10. The opportunity to present a paper	1	2	3	4	5
11. Other (please specify)	1	2	3	4	5

____

39. Please rank the following continuing education courses in terms of your interest in attending each. Please enter an "8" for the course you have the highest interest in attending, a "7" for the course having the next highest interest, and so on. Please enter a "0" for any course for which you have NO interest in attending.

1. Introductory course on a new topic ______
2. Fundamental theory course ______
3. State of the art reviews ______
4. Advanced technology course on new topics ______
5. Applications oriented course ______
6. Hands-on workshops ______
7. Classified industry briefings ______
8. Other (please specify) ______________________________

40. Please indicate how important each of the following reasons would be in making your decision to attend AIAA-sponsored continuing educations courses. (Circle Number)

	Least Important				Most Important
1. Relevance of course to your job	1	2	3	4	5
2. Reputation of the course lecturer/instructor	1	2	3	4	5
3. Tuition fee	1	2	3	4	5
4. Only source of course	1	2	3	4	5
5. Employer provided tuition reimbursement and travel	1	2	3	4	5
6. Length of the course (e.g., 2-3 days)	1	2	3	4	5
7. Format of the course (e.g., home study, satellite)	1	2	3	4	5
8. Reputation of the course sponsor	1	2	3	4	5

These data will be used to determine whether people with different backgrounds have different opinions concerning NASA LaRC technical reports.

41. Your gender: (Circle number)

1. Female
2. Male

42. Your age: (Enter number)

______

43. The highest college degree you hold: (Circle number)

1. No college degree
2. Bachelor's
3. Master's
4. Doctorate
5. Post-Doctorate
6. Other (please specify)________________

44. Your primary professional duties: (Circle **ONLY ONE** number)

1. Teaching/Academic (may include research)
2. Research
3. Design/Development
4. Manufacturing/Production
5. Quality Assurance/Control
6. Service/Maintenance
7. Marketing/Sales
8. Private Consultant
9. Management/Supervision
10. Other (please specify)____________

45. Type of organization where you are employed: (Circle **ONLY ONE** number)

1. Academic
2. Government (civilian)
3. Government (military)
4. Industry
5. Private Consultant
6. Other (please specify)____________

46. Was your academic preparation as an (Circle number)

1. Engineer
2. Scientist
3. Other (please specify)____________

47. In your present position, do you consider yourself primarily an (Circle number)

1. Engineer
2. Scientist
3. Other (please specify)____________

48. Is English your first (native) language? (Circle number)

1. Yes
2. No

49. Your years of permanent (full-time) aerospace employment: (Enter number)

______

50. Is any of your current work funded by the federal government? (Circle ONE number)

1. Yes 2. No 3. Don't know

THANK YOU!

Mail to:

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13. ABSTRACT *(Maximum 200 words)*
The U.S. government technical report is a primary means by which the results of federally funded research and development (R&D) are transferred to the U.S. aerospace industry. However, little is known about this information product in terms of its actual use, importance, and value in the transfer of federally funded R&D. Little is also known about the intermediary-based system that is used to transfer the results of federally funded R&D to the U.S. aerospace industry. To help establish a body of knowledge, the U.S. government technical report is being investigated as part of the *NASA/DoD Aerospace Knowledge Diffusion Research Project.* In this report, we summarize the literature on technical reports, present a model that depicts the transfer of federally funded aerospace R&D via the U.S. government technical report, and present the results of research that investigated aerospace knowledge diffusion vis-á-vis the technical report. To learn more about the preferences of U.S. aerospace engineers and scientists concerning the format of NASA Langley Research Center-authored technical reports, we surveyed 133 report producers (i.e., authors) and 137 report users. Questions covered such topics as (a) the order in which report components are read, (b) components used to determine if a report would be read, (c) those components that could be deleted, (d) the placement of such components as the symbols list, (e) the desirability of a table of contents, (f) the format of reference citations, (g) column layout and right margin treatment, and (h) and person and voice. Mail (self-reported) surveys were used to collect the data. The response rates for report producers (i.e., authors) was 68% and for users was 62%.

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